

Four New Early Spring-flowering Evergreen *Iris* Cultivars

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Iris, with its showy and colorful flowers, is one of the most popular ornamental plants worldwide, and is commonly grown in gardens and used as a cut flower. As the largest genus in the family Iridaceae, *Iris* comprises about 280 species (Goldblatt and Manning, 2008). There are $\approx 70,000$ known *Iris* cultivars, and more than 1000 new cultivars are produced by selection and hybridization every year (Hu and Xiao, 2012). Few of those cultivars bloom in early spring (late March to mid-April in the eastern China). According to the taxonomic system of Mathew (1981), *Iris japonica* Thunb. belongs to the subgenus *Limniris* section *Lophiris* Tausch, also known as crested irises or evansia irises. *I. japonica* is native to southern China and Japan where it blooms in early spring (Zhao et al., 2000). It is given the common name Butterfly Iris because the flower resembles a dancing butterfly. It is a traditional plant that has been cultivated in Chinese gardens since the Song Dynasty and is alluded to in many old poems (Hu and Xiao, 2012). It is hardy to between U.S. Department of Agriculture Zones 7 to 10 and can tolerate weak light conditions as well as wet and hot environments.

Selecting novel individuals from natural populations is an important way to acquire new iris cultivars. A series of early-spring-flowering ornamental *Iris* cultivars were selected from plants of *I. japonica* in 2017. These cultivars have attractive evergreen leaves and produce abundant colorful flowers

from late March to mid-April in Shanghai City, eastern China.

Origin

This series of ornamental iris cultivar was selected from strains of cultivated populations of *I. japonica* conserved at the Shanghai Botanical Garden. These plants were originally collected from the Shenlong Mountains of Hubei Province and the Zhangjiajie Mountains of Hunan Province. There is high intraspecific diversity in *I. japonica*, including variations in flower color, flower size, color pattern, and stem color. Four cultivars of *I. japonica* were evaluated with special ornamental characteristics and officially authorized to release as ‘Butterfly Dreams’ (‘Mengdie’), ‘Butterfly

Dawn’ (‘Xiaodie’), ‘Butterflies in Bloom’ (‘Huadie’), and ‘Butterfly Veil’ (‘Dieyi’) by the American Iris Society in 2019.

Description

The selection process was conducted at the Conservation Nursery of the Shanghai Botanical Garden in Shanghai, China. For each of the four new cultivars, 30 clones were planted (4 cultivars \times 30 clones) in Sept. 2016. The plants were grown in arrays with 30 cm between plants in the experimental field; they were irrigated and fertilized similarly to other perennial herbs. All plants were grown at a forest edge where they received half full-sunlight. Morphological characteristics including plant height, leaf length and width, flower color, flower diameter, inner perianth length and width, outer perianth length and width, and the flowering period of the total population. Single flowers were evaluated for a randomized sample of 15 plants per cultivar. Leaf length and width were measured on the third leaf from the top of each plant. Flower color was described according to the Royal Horticultural Society (RHS) Color Charts. The quantitative indexes of flower were measured on the second day of full bloom. Flowering period was recorded according to the dates of the first flower and the last in the population of each cultivar. The data were analyzed by SPSS 17.0 (SPSS Inc., Chicago, IL).

In Shanghai City, most irises bloom from mid-spring (late April) to early summer (June), and the leaves are winter deciduous. In contrast, the four *I. japonica* cultivars bloom in late March to mid-April and have evergreen leaves.

The height of the four new cultivars of *I. japonica* ranged from 39.33 ± 2.08 cm to 76.50 ± 3.50 cm in our trial (Table 1). Their stems were



Fig. 1. Flowers of four new cultivars of *I. japonica*, ‘Butterfly Dreams’ (A), ‘Butterfly Dawn’ (B), ‘Butterflies in Bloom’ (C), and ‘Butterfly Veil’ (D).

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Table 1. Morphological characteristics and flower periods of four new cultivars of *I. japonica*.

Cultivar	Plant ht (cm)	Leaf length (cm)	Leaf width (cm)	Flower crown size (mm)	Inner perianth length (mm)	Inner perianth width (mm)	Outer perianth length (mm)	Outer perianth width (mm)	Flowering period	Peak flower period ^z
Butterfly Dreams	76.50 ± 3.50 a	41.75 ± 5.25 bc	2.85 ± 0.05 a	62.87 ± 4.67 a	29.21 ± 2.40 a	13.11 ± 0.56 a	30.16 ± 2.38 a	23.55 ± 1.92 a	16 Mar.–17 Apr.	26 Mar.
Butterfly Dawn	71.00 ± 1.00 a	57.47 ± 2.45 a	2.40 ± 0.40 a	57.08 ± 1.88 b	27.16 ± 2.16 ab	13.79 ± 0.87 a	27.72 ± 1.40 a	20.09 ± 0.74 b	20 Mar.–20 Apr.	5 Apr.
Butterflies in Bloom	59.00 ± 8.54 b	43.40 ± 3.62 b	2.63 ± 0.25a	58.69 ± 2.65 ab	26.33 ± 2.08 ab	13.62 ± 0.66 a	28.63 ± 1.80 a	24.12 ± 1.11 a	21 Mar.–21 Apr.	5 Apr.
Butterfly Veil	39.33 ± 2.08 c	35.50 ± 2.00 c	2.58 ± 0.38 a	52.34 ± 4.97 c	24.89 ± 0.90 b	11.53 ± 0.69 b	27.59 ± 2.86 a	21.20 ± 0.96 b	18 Mar.–15 Apr.	1 Apr.

For each indicator, n = 15 samples. Means followed by different letters in the same row are significantly different ($P < 0.05$).

^zFifty percent of flowers blooming.

Table 2. Flower colors of four cultivars of *I. japonica*.

Cultivar	Color of inner perianth	Color of outer perianth			Color of crest on outer perianth		
		Color of arm	Outside	Middle	Base	Tip	Base
Butterfly Dreams	Violet N88C	Violet N87B	Violet N87B	Violet 83B	Yellow-orange 23A	Yellow-orange 23A	Yellow-orange 23A
Butterfly Dawn	Violet-blue 92A/92B	Violet-blue 92A/92B	Violet-blue 92A/92B	Violet 83B	Yellow-orange 23A	Orange 24A	Orange 24A
Butterflies in Bloom	White NN155D	Purple-violet N81D	White NN155D	Violet 83B	Yellow-orange 20A/21B	Yellow-orange 20A/21B	Yellow-orange 20A/21B
Butterfly Veil	White NN155D	Violet N88D	White NN155D	Violet N87B and gray-orange 165B spots	Yellow-orange 20A/21B	Orange 24A	White NN155D

found to be strong, straight, and upright. In contrast, the stems of common *I. japonica* varieties are untidy and messy. The four cultivars produced different numbers of inflorescence branches, with flower numbers ranging from 24 to 68 per plant in our trial.

The four new cultivars of *I. japonica* produce flowers with colors and patterns that differ from those of common *I. japonica* varieties, which produce white or pale purple flowers. Meanwhile, with 3 years of observation, the traits of four new cultivars (e.g., flower color and flower pattern) were stable because they were selected from asexual stains in 2017.

- The cultivar Butterfly Dreams (Fig. 1A) produces dark purple (RHS violet N87B) flowers, the central crest is yellow-orange (yellow-orange 23A), tipped dark violet (violet 83B) around the crest on the outer perianth (Table 2). It has purple stems, with 30 to 44 flowers per stem. The plant height is 76.5 ± 3.50 cm (Table 1).
- The cultivar Butterfly Dawn (Fig. 1B) has violet-blue (violet-blue 92A/93B) flowers with a striking yellow patch (yellow-orange 23A) and a purple circle (violet 83B) on the outer perianth (Table 2). It has green stems with 42 to 56 flowers per stem. The plant height is 71.0 ± 1.00 cm (Table 1).
- The cultivar Butterflies in Bloom (Fig. 1C) has a purple stem, and its flower has a yellow patch (yellow-orange 20A/21B) and a purple circle (violet 83B) that present a striking contrast to its white perianth (White NN155D), and it has a pale purple (purple violet N81D) arm (Table 2). Its plant height is 59.00 ± 8.54 cm, with 58 to 68 flowers per stem (Table 1).
- The cultivar Butterfly Veil produces a graceful blue and white porcelain flower (White NN155D). The crest on the outer perianth is surrounded by violet (violet N87B) and gray-orange spots (Table 2). It has green stems, with 24 to 30 flowers per stem. It has the shortest plant height of the four cultivars, only 39.33 ± 2.08 cm (Table 1).

Each flower of these four cultivars can bloom for 2 to 3 d. Flowers open consecutively over the course of up to 3 weeks. These new cultivars are well adapted to a half-shade environment, whereas most irises thrive in full sunlight. They have been sufficiently free of pests and disease since they were grown at the Shanghai Botanical Garden in 2015. The four cultivars have evergreen, sword-like leaves, and thus their ornamental period is longer than that of most *Iris* cultivars.

In summary, we described four new cultivars of *I. japonica* that produce lovely medium-sized flowers for a long period in early spring and retain evergreen leaves. They are excellent choices as cover plants near or in forests, and they can be used as cut flowers. They can also be used to hybridize

with different populations of *I. japonica* or other related species to obtain new colorful crested irises.

Availability

The four cultivars of *I. japonica*, Butterfly Dreams, Butterfly Dawn, Butterflies in Bloom, and Butterfly Veil, are available for research

or trials. Requests for samples of cloned plants may be addressed to Dr. Yue-E Xiao (e-mail: xiaoyuee@shbg.org), Research Center of Shanghai Botanical Garden, Shanghai, China.

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